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U. S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
CALIFORNIA FOREST AND RANGE EXPERIMENT STATION
Division of Forest Insect Research

FOREST INSECT CONDITIONS
CUYAMACA RANCHO STATE PARK
SAN DIEGO COUNTY, CALIFORNIA
OCTOBER 1955
APPRAISAL SURVEY

Introduction

On October 21, 1955, an inspection of forest insect conditions within Cuyamaca Rancho State Park was made by the author in company with Maurice Morgan, Clyde Strickler, and Don Lawyer of the State Division of Beaches and Parks; Dan Dotta and Paul Sischo of the State Division of Forestry; and Paul Kevin of the U. S. Forest Service. The examination was requested by the State Division of Beaches and Parks on August 22, 1955.

Although the inspection of the Park was limited to but two hours, the trip planned by Ranger Morgan was sufficient to provide information for an evaluation of the situation.

Status of Insect Pests

The insect problem within the Park this year is confined for the most part to losses in Jeffrey pine, Pinus jeffreyi Grev. and Balf., caused by the California flatheaded borer, Melanophila californica Van Dyke. Coulter pine losses caused by the western pine beetle, Dendroctonus brevicomis Lec., are low this year, as they were last year, due, in large part, to the control program against this insect in the spring of 1953. Tree losses caused by the mountain pine beetle, Dendroctonus monticolae Hopk. and pine engravers, Ips sp., in their various host trees within the Park, remain low.

The losses caused by the California flatheaded borer have not been severe in any one year, but they have continued at a fairly steady rate and have resulted in progressive depletion of the stand. The loss of Jeffrey pine in any one year is not so striking as the occasionally serious Coulter pine loss caused by the western pine beetle. This is due in part to the grouping tendency of the western pine beetle compared to the more scattered losses caused by the California flatheaded borer. The difference in the character of the damage caused by these two insects is mentioned because of the attention given the western pine beetle outbreak surrounding the Conejos Burn, which, although spectacular at the time, actually was no more serious than the annual drain to the stand caused by the California flatheaded borer.

In the spring of 1954, it was recommended^{1/} that direct control of the California flatheaded borer infestation be undertaken and that the year-round maintenance control program then in effect against bark beetles be continued and include both the western pine beetle and the California flatheaded borer. In the spring of 1954, control work against the California flatheaded borer was carried on. Since that time no control work against this insect has been undertaken; consequently, losses have continued unchecked in 1955.

If insect damage is to be kept to a minimum in the Park, we believe that a continuous program to control both the California flatheaded borer and bark beetles should be carried out on a year-round basis over several years. To understand why a continuous control program against the flatheaded borer is needed, one must understand the essential points in the life history of the insect. A brief account of the biology of the borer is given in the following paragraphs to help clear up any misconceptions that may exist.

Habits of Flatheaded Borers

The eggs are laid by the female beetles in the bark crevices of the host tree during the early summer months. After a period of 9 to 19 days, the larvae hatch and bore into the cambium. The larvae may feed in the cambium region from a few months up to four or more years without killing the tree. In this stage they are called "incipient" larvae. If the larvae die during this period of their development, the only evidence of their activity is a faint scar left on the sapwood and inner bark. If, however, the larvae survive, they pass into a fast-growing stage and rapidly kill large portions of the cambium region. Fast-growing larvae may form at any time from the first year on. Once in the fast-growing stage, the larvae develop to prepupae in the outer bark during late summer and fall or during the following spring. The pupal stage is reached by late spring or early summer and lasts approximately 30 days. The adult beetles begin emerging in May and continue to emerge until August. The peak emergence usually occurs in July.

The damage caused by this insect in the fast-growing larval stage may result in the topkilling of trees, patch-killing, or the death of the entire tree. In all cases, the insect is capable of producing successful brood; however, the majority of the brood in a given area will emerge from completely killed trees.

"Incipient" flathead-infested trees oftentimes exhibit a progressive decline in vigor. This decline is usually indicated by a shortening of the needles, loss of normal needle complement, dead or dying branches and twigs in the crown, and an overall sickly appearance. The fading characteristics of California flatheaded borer-killed trees are somewhat different from those of trees killed by other cambium mining insects. As a general rule, the attacked trees fade very slowly, some taking the better part of a year.

^{1/} Downing, G. L. Forest Insect Conditions, Cuyamaca Rancho State Park, San Diego County, California, November 1953. Reconnaissance Survey. C.F.& R.E.S. Mar. 4, 1954.

However, an undetermined number of attacked trees will remain green throughout the winter months and not fade until early to mid-summer; that is, they will start to fade just before the adult beetles emerge. It is because of this long period of fading that a year-round control program is necessary against this insect. The need for maintaining this program is occasioned by the prolonged life cycle that at least some of the borers of this species exhibit.

Discussion

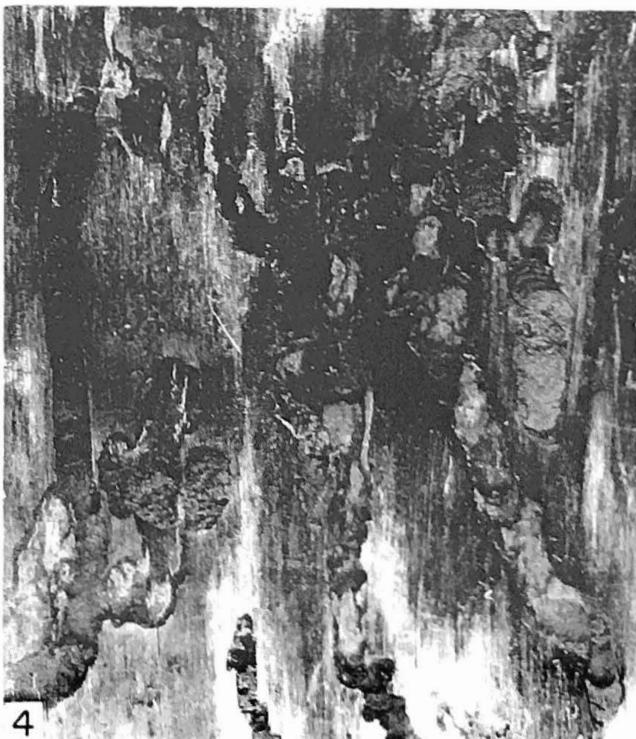
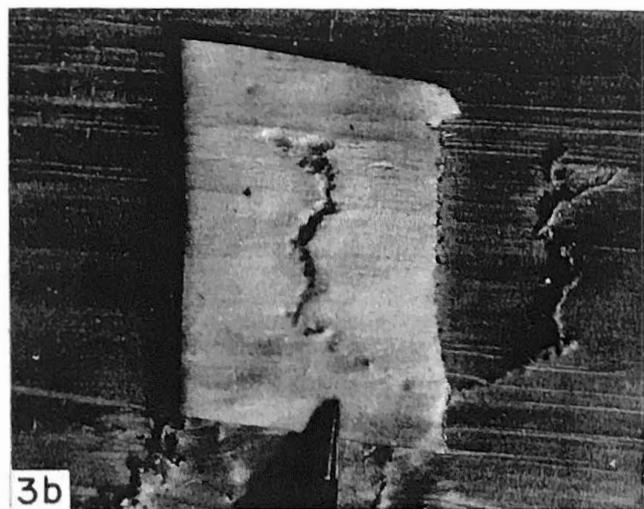
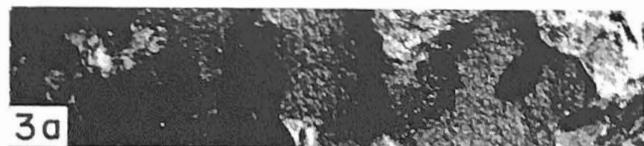
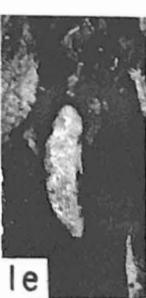
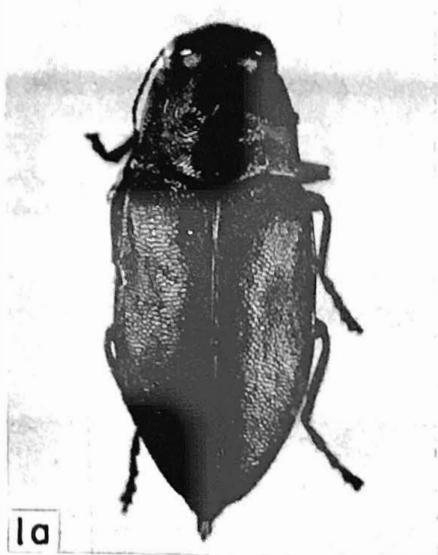
The timber stands within the parks, administered by the Division of Beaches and Parks, are being managed for their recreational and aesthetic value and not for any commercial timber value they may possess. Because of this, it is desirable to prevent the loss of any trees from insect attack and, of course, from other causes. Although it is not possible with present methods to prevent all insect-caused losses in a stand, it is possible in many instances to keep the damage to a minimum. In order to do so, the following action is suggested:

1. Begin a program of direct control against broods of the pine bark beetles and the California flatheaded borer within the Park. Control to be accomplished through the use of a penetrating oil spray, ethylene dibromide in diesel oil. (See C.F.& R.E.S. Misc. Paper No. 17, Oct. 15, 1954)
2. Establish a policy of year-round maintenance control against the above-named insects, providing for treating insect-killed trees (before the insects emerge) throughout the year whenever they appear.
3. Continue direct control on a maintenance basis for at least four years, so that the benefits of the program will have a chance to accrue.

Berkeley, California
November 16, 1955

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Entomologist

THE CALIFORNIA FLATHEADED BORER
Melanophila californica Van Dyke



1 - (a) adult beetle, X6; (b) fast-growing larva, X2; (c) eggs, X4; (d) prepupal larva, X1; (e) pupa, X2.

2 - Ponderosa pine killed by flatheaded borers.

3 - (a) adult emergence holes in bark; (b) incipient larva and galleries in sapwood and phloem.

4 - Frass-packed galleries of large larvae in inner bark.